4.8 WATER RESOURCES

4.8.1 Impact Methodology

Identifying project impacts relies heavily on the use of available studies, reports, observations, and engineering judgment to make reasonable inferences about the potential effects of the project, given the interpretation of the hydrologic setting described in the affected environment sections. These available documents include studies and reports of adjacent lands, including those that are being considered for purchase or lease as additional lands. In addition, some water resources impacts may be evaluated in the context relative to regulatory standards or guidelines. Regulatory standards include, but are not limited to, the following:

- Federal and state primary and secondary drinking water standards under the Safe Drinking Water Act;
- State and local plans and policies protecting surface water and groundwater resources;
- Limits on development of available surface and groundwater resources;
- Compliance with the Clean Water Act;
- Source water protection program requirements;
- Coastal Zone Management Act regulations; and
- State water code regulations.

Project impacts are compared against both current conditions and future conditions.

A computer model called the Army Training and Testing Area Carrying Capacity (ATTACC) model was used to estimate erosion impacts associated with vehicle use in the training ranges. The ATTACC model evaluates the relationship between military land use, land conditions, and land maintenance and repair practices that can be used to restore the carrying capacity of the land. The model first estimates the training load, based on a number of factors comparing the vehicles under consideration to a standard military vehicle (an M1A2 tank). These factors include the weight of the vehicle, wheel type and size, and nature of use during training. Then, incorporating variables representing the physical characteristics of the land (such as soil characteristics, vegetation cover, and terrain), the model predicts soil erosion rates using the Revised Universal Soil Loss Equation developed by the Natural Resources Conservation Service (NRCS). With this estimate as a starting point, model parameters can be varied to identify land management practices (such as reduction in use, revegetation, and application of water) that would reduce damage.

4.8.2 Factors Considered for Impact Analysis

Factors considered in determining whether an alternative would have a significant impact on water resources include the extent or degree to which its implementation would:

- Degrade surface or groundwater quality in a manner that would reduce the existing or potential beneficial uses of the water;
- Reduce the availability of, or accessibility to, one or more of the beneficial uses of a water resource;
- Alter the existing pattern of surface or groundwater flow or drainage in a manner that would adversely affect the uses of the water within or outside the project region;
- Be out of compliance with existing or proposed water quality standards or with other regulatory requirements related to protecting or managing water resources;
- Conflict with Hawai'i Coastal Zone Management Program policies;
- Compliance with the Clean Water Act;
- Substantially increase risks associated with human health or environmental hazards; or
- Increase the hazard of flooding or the amount of damage that could result from flooding, including from runoff or from tsunami or seiche runup.

In addition to these factors, public concerns expressed during the scoping process were considered in the impact analysis. These concerns included the cumulative effects of residual contaminants from munitions use, such as lead and explosives, on water quality. In response to these concerns, the Army performed a surface soil investigation at training ranges at SBMR and PTA. Additional public comments concerned surface water and groundwater impacts at PTA, existing groundwater contamination and remediation at SBMR, watershed health, depletion of limited water resources on the islands, and the Army's commitment to preserving water resources for the future. These concerns are addressed in the water resources, human health and safety hazards, and public services and utilities sections of this EIS.

4.8.3 Summary of Impacts

Table 4-8 lists the types of water resources impacts associated with the Proposed Action, the Reduced Land Acquisition Alternative, and the No Action Alternative. The four water resource impact issues are impacts on surface water quality, impacts on groundwater quality, impacts as an increased flood potential, and impacts on groundwater supply. A rating of significant impact, significant impact but mitigable to less than significant, less than significant impact, and no impact were assigned to each alternative for each facility, based on the discussion below. A project-wide impact level was assigned to each of the issues, based on a judgment rating from the cumulative impacts for all of the facilities, and in most cases is the worst case rating from any individual facility.

Proposed Action (Preferred Alternative)

Significant Impacts

There are no significant impacts on the water resources for the Proposed Action at any of the facilities that cannot be mitigated to a less than significant impact, so there are no significant impact ratings on Table 4-8.

Table 4-8
Summary of Potential Water Resources Impacts

Impact Issues	SBMR			DMR			KTA/KLOA			PTA			Project-wide Impacts		
	PA	RLA	NA	PA	RLA	NA	PA	RLA	NA	PA	RLA	NA	PA	RLA	NA
Impacts on surface water quality	⊘	⊘	⊙	⊙	⊙	○	⊘/⊙	⊘/⊙	⊘/○	⊙	⊙	⊙	⊘	⊘	⊘
Impacts on groundwater quality	⊙	⊙	⊙	○	○	○	⊙/○	⊙/○	⊙/○	⊙	⊙	○	⊙	⊙	⊙
Increased flood potential	⊙	⊙	⊙	⊙	⊙	⊙	⊙/○	⊙/○	⊙/○	○	○	○	⊙	⊙	⊙
Groundwater supply	⊙	⊙	⊙	○	○	○	○/○	○/○	○/○	○	○	○	⊙	⊙	⊙

This table summarizes project-wide impacts. For installation-specific impacts see Chapters 5 – 8.
In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

LEGEND:

⊗ = Significant
⊘ = Significant but mitigable to less than significant
⊙ = Less than significant
○ = No impact
+ = Beneficial impact

N/A = Not applicable
PA = Proposed Action
RLA = Reduced Land Acquisition
NA = No Action

Significant Impacts Mitigable to Less than Significant

Impact 1: Impacts on surface water quality. All of the water quality impacts on surface water are summarized under this heading. Some of the individual types of impacts are likely to be less than significant, but the overall impacts on water quality are considered significant but mitigable to less than significant.

Impact 1a: Impacts on surface water quality from construction. Less than significant construction impacts on surface water quality would occur at SBMR, DMR, KTA, and PTA. Potential short-term construction-related impacts on water quality could occur if stormwater runoff were to come into contact with disturbed soils or exposed soil contaminants in construction sites, including road construction sites, and if the runoff then discharged to streams or other surface waters. This type of impact could occur at construction sites at all installations, but is expected to be less than significant because construction activities on sites involving disturbance of areas greater than 1 acre (0.4 hectare) (which effectively includes all of the proposed construction projects), must comply with Phase 2 Stormwater Regulations. Also, at PTA, lack of any perennial streams would generally make this type of impact less than significant because stream flow lasts only for a short time following rainfall events.

Regulatory and Administrative Mitigation 1a: The Army will implement design measures in accordance with new Phase II Stormwater Management Regulations of the Clean Water Act. The Army will choose the most practicable solution for the specific project or project area during design. As directed via NPDES permit approval, the contractor will be required to implement a stormwater pollution prevention program during construction.

For constructing low-water crossings, the Army will incorporate BMPs that will reduce runoff and sedimentation to aquatic environments in accordance with CWA regulations for stormwater runoff at construction sites.

Impact 1b: Impacts on surface water quality from chemical residues or spills. The Proposed Action could result in significant chemical residue spills on the surface soils that could affect the surface water quality at SBMR and PTA. Accumulation of chemical residues in surface soils or occasional spills that may occur during routine training activities can also contribute to degradation of surface water quality.

As with short-term construction-related sources, these may also be from nonpoint sources. As explained below, the Army spill prevention and control plans lessen impacts associated with this type of threat. However, they are related to new, as well as ongoing, activities that would occur over the long-term. Explosives residues on surface soils on live-fire training ranges are an example. Recent soil sampling at SBMR and PTA provided information about concentrations of explosives, semi-volatile organic compounds, and metals in surface and near-surface soils at sites that were selected to represent sites that have a high likelihood of being contaminated based on their use (USACE 2002a). The results indicated sporadic occurrence of contaminant concentrations greater than EPA preliminary remediation goals (PRGs). PRGs are risk-based concentrations designed as initial screening-level values to quickly identify areas in which soil remediation may be necessary to protect health. The site-specific conditions will dictate whether remediation of the soils is necessary, but these screening values can be used as guidance levels to assess the significance of the concentrations in the surface soils that could affect human health by direct contact or that could affect the surface water that comes in contact with these soils.

Concentrations of some metals that exceeded PRGs, such as aluminum and iron, are probably representative of the range of natural background concentrations in Hawaiian soils. Concentrations of lead that exceeded residential or industrial soil PRGs in some samples may be due to disintegration of bullets. Metals concentrations that exceed the PRGs may not necessarily affect surface water because of their low solubility. The principal explosives contaminant of concern identified in soils was RDX, with a much greater solubility. Concentrations of RDX, and other soluble contaminants, in the samples collected from PTA could affect surface and groundwater but are unlikely to result in significant impacts on these media due to the lack of permanent surface water and the great depth to groundwater. Concentrations of soluble contaminants in soils at SBMR have a greater potential to affect surface water because of the higher precipitation there. Due to the low concentration of soluble contaminants documented to date, it is unlikely that these contaminants would significantly affect surface water quality.

Dust control measures to reduce fugitive dust emissions, as discussed in Section 4.5, would be needed at KTA, DMR, SBMR, and PTA. These measures may include treating roads or tracks in maneuver areas with chemicals, such as calcium or magnesium chloride, calcium lignosulfonate, or other environmentally friendly materials that would not impair water quality. These chemicals bind soil particles to form aggregates, and the larger, heavier aggregate particles tend to precipitate from the air sooner than when the soil is finer grained.

These chemicals may affect surface water quality if applied excessively or if applied during rainfall and runoff. Lignosulfonates are products of the wood pulp industry that affect water quality by using available oxygenas the wood fiber decays. Calcium and magnesium chloride are salts, which, although much less soluble than table salt, can dissolve and increase the total dissolved solids concentration in water. Of course, the purpose of the treatments would be to reduce dust, which would occur primarily during dry conditions or in dry areas, such as at PTA and the WPAA. In wetter areas, dusty conditions are likely to occur only during certain times of year and for brief periods. When properly applied, these dust control chemicals are not expected to significantly affect surface water quality or biota (Parametrix, undated).

Regulatory and Administrative Mitigation 1b. SBMR is the only installation under evaluation with perennial streams downslope of live-fire training ranges. There is no evidence that explosives residues are present in surface water downstream of SBMR. If explosives are found to contribute to degradation of surface water quality, effective mitigation measures could be implemented.

The Army will implement design measures in accordance with new Phase II Stormwater Management Regulations of the Clean Water Act. The Army will chose the most practicable solution for the specific project or project area during design. As directed via NPDES permit approval, the contractor will be required to implement a stormwater pollution prevention program during construction.

The Army will implement the existing SPCC plan to all new land and activities under the Proposed Action. RCRA requires facilities that manage hazardous materials and generate and store waste to implement an array of procedures to address the potential for spills. Also, the Army is required to prepare SPCC Plans and Installation Spill Contingency Plans (ISCPs) in compliance with DOD Directive 5030.41, to implement USEPA Regulations on oil pollution prevention under the National Oil and Hazardous Substances Pollution Contingency Plan. As defined in Directive 5031.41, an SPCC plan establishes procedures to prevent oil discharges or to minimize the potential for oil discharges at a specific installation. An ISCP establishes procedures for reporting, containing, and removing oil or hazardous substance discharges caused by the specific installation. Thus, each installation implements the programs applicable to the spill hazards that exist at the particular installation. Spill prevention and response is discussed further in the Human Health and Safety Hazards section.

Based on the known significant chemical residue spill impacts, the potential for future significant chemical residue spill impacts, and the mitigation of these spills through compliance with regulatory requirements, the Proposed Action would have a significant but mitigable to less than significant impact on surface water quality at SBMR (Table 4-8).

Impact 1c: Impacts on surface water quality from suspended sediment. The Proposed Action could result in a significant long-term impact on surface water quality from suspended sediment loading resulting from erosion related to maneuver training at SBMR, SBER, and KTA. Erosion can increase the turbidity of the water. Results of ATTACC modeling suggest that maneuver training may already increase soil erosion rates and that soil erosion would increase at SBMR, SBER, KTA, and PTA. This is considered to be a potentially significant long-term impact at SBMR, SBER, and KTA, where the eroded sediment could reach surface water, but it is unlikely to affect surface water quality at PTA due to lack of perennial streams there. ATTACC modeling suggests that soils would be significantly disturbed at DMR, but due to the flat slopes and low rainfall at DMR, the impacts on surface water quality are not expected to be significant.

Erosion impacts may occur during construction of roads and trails; these impacts would be temporary and would be reduced to less than significant levels through implementation of construction BMPs as required under Phase 2 stormwater regulations. Similarly, erosion from runoff at building construction sites could affect water quality in nearby streams, but these impacts are not expected to be significant because construction stormwater BMPs would be implemented in compliance with regulatory requirements.

The mitigation measures below will reduce these impacts to less than significant.

Regulatory and Administrative Mitigation 1c. The Army will continue to implement land restoration measures identified in the INRMP. Mitigation measures include, but are not limited to, implementation of the ITAM program to identify and inventory land condition using a GIS database; coordination between training planners and natural resource managers; implementation of land rehabilitation measures identified in the INRMP; monitoring of the effectiveness of the land rehabilitation measures; evaluation of erosion modeling data to identify areas in need of improved management; and implementation of education and outreach programs to increase user awareness of the value of good land stewardship.

The Army will develop and implement a DuSMMoP for the training area. The plan will address measures such as, but not limited to, restrictions on the timing or type of training during high risk conditions, vegetation monitoring, soil monitoring, and buffer zones to minimize dust emissions in populated areas. The plan will determine how training will occur in order to keep fugitive dust emissions below CAA standards for PM_{10} and soil erosion and compaction to a minimum. The Army will monitor the impacts of training activities to ensure that emissions stay within the acceptable ranges as predicted and environmental problems do not result from excessive soil erosion or compaction. The plan will also define contingency measures to mitigate the impacts of training activities that exceed the acceptable ranges for dust emissions or soil compaction.

Additional Mitigation 1c: The Army proposes to implement design measures in accordance with Army design standards to reduce soil erosion and sediment loading impacts on Waikele Stream, Konokanahua Stream, or tributaries from road construction. Mitigation design measures include, but are not limited to, hardening the roads, raising the elevation of the roadway to improve drainage, installing drainage ditches adjacent to roads to control water running on or off the road, planting grasses to slow overland flow. The Army would choose the most practicable solution for the specific project or project area during design.

Impact 1d: Impacts on surface water quality from sediment or contaminant loading following wildland fires. Surface water quality may be affected indirectly by increased erosion caused by wildland fires.

This could create a significant impact on surface water quality at SBMR and PTA. Fires remove vegetation that otherwise would act to intercept and dampen the impacts of raindrops before they hit the soil surface, as well as slowing runoff and anchoring soils.

Fires may occur naturally, or they may be inadvertently initiated because of training activities or other man-made causes. Live-fire training activities on the ranges at SBMR and PTA increase the potential for fires because they can bring flammable or explosive materials in proximity to fuel. Fires can also generate toxic chemicals that have the potential to enter streams via runoff. Most of these chemicals are naturally occurring, although some may be generated by burning of plastics or other man-made materials. Some fires occur naturally, but human activities may increase the frequency of fires, resulting in higher than natural loading of chemical products of combustion to receiving surface waters. The mitigation measures below will reduce the impacts to less than significant.

Regulatory and Administrative Mitigation 1d. The IWFMP for Pōhakoloa and Oʻahu Training Areas was updated in October 2003. The Army will fully implement this plan for all existing and new training areas to reduce the impacts associated with wildland fires. The plan is available upon request.

Less than Significant Impacts

Impacts on groundwater quality. Residues of explosives and other constituents of munitions would continue to be deposited on soils on training ranges at SBMR and PTA. While the rate at which metallic lead from bullets would be deposited on the ranges would likely increase by 25 percent overall, the concentrations of lead that would be detected in soil samples taken at some future date would not increase by a similar amount. There are several reasons for this. The lead comes from the gradual weathering and disintegration of bullets in addition to other possible sources of lead in munitions, all of which is in addition to the natural background concentration of lead in the soils. Each year, more bullets accumulate on the ranges, adding slightly to the average concentration of lead present in the soils. Some of the lead is removed with soils through erosion. Some migrates deeper in the soil column. Also, much of the increased use of bullets will occur on small arms firing ranges where the bullets are deposited in small target areas. Therefore, the additional lead projectiles will not be widely dispersed on the ranges. Therefore, it is likely that the rate at which lead is deposited on ranges will decrease, while the concentration of lead in soils will continue to increase for a time, and then decrease when lead bullets are phased out. Since the lead is widely distributed, except in the small arms target ranges, the rate at which concentrations in soils increase in any particular location should be very low. It should also be noted, as mentioned in the EIS, that the Army is evaluating a gradual shift from use of lead-containing ammunition to use of "green ammunition" that does not contain lead. Small quantities of these residues could be transported downward through soils and rock with infiltrating rainwater. In general, the concentrations of chemicals that would be dissolved and mobilized by contact with rain water are likely to be very small, and as described above, are not likely to impact surface water. The migration pathway of runoff to surface water is more direct than the pathway to groundwater, because infiltrating rainwater must pass through soils and fractured rock in order to reach the depth of the groundwater aquifer. During this migration, interaction between the chemicals and the surfaces of soil particles would further reduce the concentrations of chemicals in the infiltrating water. At both SBMR and PTA, these interactions would occur over appreciable depths to groundwater, and this is expected to prevent significant impacts on groundwater from chemical residues on ranges. At all installations, groundwater could be impacted by accidental chemical spills, or fuel leaks from vehicles and equipment, either during construction or during long term operation of facilities. Accidental spills would be addressed by spill prevention and cleanup procedures that are currently in place, so that such impacts are expected to be less than significant (Table 4-8).

Increased flood potential. Flood hazard has been identified as a less than significant impact at SBMR and KTA. The potential for flooding could increase if impermeable surface area increases significantly, reducing infiltration of stormwater, generating more stormwater runoff, or focusing or concentrating the discharge in a smaller area. The result could be more frequent flooding in areas that are already prone to flooding. In general, this is not expected to result in a significant impact because stormwater collection systems would be designed to avoid these impacts, because the increase in impermeable surface area would be small, and because runoff rates already vary over a wide range, so the amount of any increase in runoff would be hard to identify within the natural variability in runoff. The only area in which existing flood zones have been identified is on the Waikele Stream west of WAAF. Flooding there occurs within the gulch of Waikele Stream but can inundate facilities located within the gulch.

None of the project areas is within a tsunami runup zone, although some may be marginally affected by flooding in the event of a tsunami, including areas near the shore at DMR and Kawaihe Harbor (terminus of PTA Trail). The project is not expected to increase exposure to or hazards resulting from flooding.

Based on this assessment of the potential flooding hazards, the Proposed Action would have a less than significant impact on SBMR, DMR, and KTA (Table 4-8).

Depletion of groundwater supply. Groundwater use is identified as a less than significant impact at SBMR. Groundwater demand is approaching the limits of supply on O‘ahu, and an increase in groundwater use would contribute to the narrowing of this margin. However, groundwater use is not expected to increase significantly as a result of the project because the project would not substantially increase the number of military personnel and would not significantly increase demand for water. Also, there is no local water supply shortage at the principal water use sites (SBMR and KTA), and at PTA the additional water requirements of the Tactical Vehicle Wash would be supplied by hauling in additional water from areas where there is a sufficiently abundant supply. Therefore, the Proposed Action would have a less than significant impact on groundwater supply at SBMR and no impacts on groundwater at DMR, KTA, and PTA.

Reduced Land Acquisition Alternative

The impacts on water resources of Reduced Land Acquisition would be the same as described under the Proposed Action. Although there would likely be a reduced potential for soil erosion and transport to Waikele Stream or its tributaries because maneuver training would not occur on the SRAA, the increased intensity of use of the available land at SBMR, SBER, and KTA would probably result in greater overall impacts on surface water quality from erosion and suspended sediment loading. The same mitigation measures discussed under the Proposed Action would also be applied to this alternative; therefore, the same ratings for the Proposed Action are assigned to this alternative for all of the water resources' impact issues (Table 4-8).

No Action Alternative

Significant Impacts Mitigable to Less than Significant

Impact 1: Soil erosion and surface water quality from training exercises. Under No Action, the potential for eroding soils to affect surface water quality at KTA would continue to be potentially significant. ATTACC modeling results indicate that the current land condition has been moderately affected by training and that the current rates of soil erosion exceed the goal of long-term sustainability.

Regulatory and Administrative Mitigation 1. Mitigation measures would be the same as those described above for impacts on soil erosion and surface water quality from training exercises of the the Proposed Action.

Less than Significant Impacts

Under the No Action Alternative, the current less than significant impact levels for all of the identified water quality issues are expected to continue at the same level. One exception to this is the hazard associated with flooding. Although only the eastern portion of DMR is included in the FEMA flood zone study map for the area, and the flood zone in the rest of DMR has not been determined, it appears likely, based on the portion that was studied, that flooding could occur in the remaining portion of DMR but that it would not be significant.